Acromag®

Model 275
Hand Held HART Communicator
For Configuration Of Series 155H Transmitters

MODEL 275 COMMUNICATOR
TRANSMITTER CONFIGURATION MANUAL

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IMPORTANT SAFETY CONSIDERATIONS

It is very important for the user to consider the possible adverse effects of power, wiring, component, sensor, or software failures in designing any type of control or monitoring system. This is especially important where economic property loss or human life is involved. It is important that the user employ satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

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1.0 INTRODUCTION

These instructions cover the field reconfiguration of Acromag Series 155H "puck-style" Transmitters using the industry-standard, Model 275 Hand-Held HART® Communicator available from Fisher-Rosemount. The intent of this manual is not to offer comprehensive information on the Model 275, but to supplement the information provided with the Model 275 as it pertains to the configuration of the Acromag Model 155H-0600 Transmitters. Specific information pertaining to transmitter hardware and electrical specifications is provided in the Series 155H User's Manual that came with your module. Configuration of Series 155H transmitters via the HockeyPuck Configuration Software and PC/155H HART Interface Adapter is covered in Transmitter Configuration Manual 8500-612.

DESCRIPTION

The Model 275 HART® Communicator is an industry standard, hand-held, interface device for HART compatible instruments, such as the Acromag Series 155H Transmitters. All transmitter functions are reprogrammable and downloadable to the module via the Model 275 Communicator, without having to connect to a computer. Use of the Model 275 makes field configuration of these transmitters portable, quick, and easy. There are no special commands to memorize or complicated program routines to follow. All configuration information is organized for you in easy to use menu screens. Complete configuration of your transmitter only takes a few minutes with this device.

Series 155H transmitters support a variety of input types and provide an isolated process current two-wire output. The Model 275 HART Communicator will interface with this transmitter, or any other HART compatible device from any wiring termination point in the 4-20mA loop, as long as a minimum resistance of 250Ω is present between the Model 275 and the loop power supply. HART uses a frequency shift keying (FSK) technique based on the Bell 202 standard. This technique superimposes high frequency digital communication signals on the standard 4-20mA loop signal, without disturbing or interfering with the 4-20mA signal.

There are two other methods of reconfiguring 155H Transmitters: via the HockeyPuck Configuration Software and PC/155H HART Interface Adapter, or via the push-buttons of the optional LCD display. Configuration using these methods is not covered here. Refer to the Series 155H User's Manual (8500-610) and Transmitter Configuration Manual (8500-612) for information on alternate methods of reconfiguration.

Acromag offers a full line of standard and custom transmitter, alarm, and isolator types to serve a wide range of applications--please consult the factory for more information on other quality Acromag products, or visit our web site at www.acromag.com.

Key Model 275 Features

- **Safety Approved** - The HART Communicator meets the Intrinsic Safety requirements of the listed regulatory agencies, including FM, CSA, and CENELEC.
- **Universal HART Compatibility** - The HART Communicator will interface with any HART compatible instrument via the 4-20mA process loop, without disturbing the 4-20mA signal.
- **Optional Storage For Over 100 Device Configurations** - The standard Model 275 memory will store up to 10 configurations, while the optional Data Pack 100 adds storage for over 100 different configurations.
- **Non-Intrusive To Process Loop** - The HART interface of this device will not interfere or disturb the 4-20mA signal.
- **Programmable Hot Key** - The keypad of this device includes a Hot Key that may be programmed for fast access to routine tasks.
- **Convenient Battery Power** - The HART Communicator is powered via five 1.5V AA batteries, or an optional rechargeable NiCad battery pack.
- **Rugged Construction** - The HART Communicator is resistant to shock & chemical hazards.
- **Compact, Portable, Hand-Held** - The Model 275 is lightweight, portable, and easily handled with one hand.

ORDERING INFORMATION & ACCESSORIES

The following lists the Model 275 ordering information and available spare parts and accessories. These items are ordered from Fisher-Rosemount and listed here for reference only. Complete and up to date information on these items and accessories can be obtained from Fisher-Rosemount (http://www.fisher-rosemount.com).

Table 1: Fisher-Rosemount Model 275 Ordering Information

MODEL/CODE	PRODUCT/DESCRIPTION
275	HART Communicator
D	Standard Battery Holder For 5 AA Batteries
R	Rechargeable NiCad Battery Pack
1	110/120VAC, 50/60Hz (US Plug)
2	220/230VAC (European Plug)
3	220/230VAC (UK Plug)
9	None (Use With Battery Pack Option "D")
E	English Language
I0	No Approval
I1	CENELEC - Intrinsic Safety Certification
I5	FM - Intrinsic Safety Approval
I6	CSA - Intrinsic Safety Approval
A	1.25MB Memory
B	4MB (Standard)
00	Standard Factory Device Descriptors Load
D1	Shipped with (1) Data Pack 100 Installed
D2	Shipped with (2) Data Pack 100's
00	Ship Without Data Pack 100

For example, a typical Model 275 Hand Held Communicator model number would be 275D9EI0B0000.

Table 2: Model 275 Spare Parts & Accessories

PART NUMBER	DESCRIPTION
00275-0003-0100	1.25MB Memory Module
00275-0003-0300	4MB Memory Module (Standard)
00275-0006-0100	Fisher-Rosemount Data Pack 100
00275-0007-0001	Recharger 220/230VAC (UK Plug)
00275-0007-0002	Recharger 220/230VAC (Euro Plug)
00275-0007-0003	Recharger 100/120VAC (US Plug)
00275-0093-0001	Lead Set With Connectors
00275-0094-0001	Hanger (Mounts On Belt Clip)
00275-0095-0001	Belt Clip With Screws
00275-0096-0001	Ruggedized 250Ω Load Resistor
00275-0100-0001	Carrying Case
00275-1070-0100	AA Alkaline Battery Pack For Code I0
00275-0170-0101	AA Alkaline Battery Pack For Code I1
00275-0170-0102	AA Alkaline Battery Pack For Code I5
00275-0170-0103	AA Alkaline Battery Pack For Code I6
00275-0171-0100	NiCad Battery Pack For Code I0
00275-0171-0101	NiCad Battery Pack For Code I1
00275-0171-0102	NiCad Battery Pack For Code I5
00275-0171-0103	NiCad Battery Pack For Code I6
00275-8026-0001	Pocket Size User's Manual

2.0 GETTING STARTED

INTRODUCTION TO HART

Model 155H transmitters are programmable via the HART communication protocol using the same two-wire interface of the output and power.

HART is an acronym for Highway Addressable Remote Transducer. It is a convenient method of transmitting and receiving digital data along the analog 4-20mA process loop. The HART communication protocol operates using a frequency shift keying method based on the Bell 202 communication standard. That is, HART uses two frequencies of a sine wave super-imposed on the DC signal cables of the process loop to represent a set and clear bit. A 0 bit is represented by a 1200Hz sine wave, and a 1 bit uses a 2400Hz sine wave. Because the average (DC) value of a sine wave is zero, the 4-20mA DC signal is not affected. The amplitude of the sine wave is approximately equivalent to ±0.5mA.

Additional information and literature regarding the HART® communication protocol can be found by accessing the HART Communication Foundation web site at http://www.hartcomm.org.

ELECTRICAL CONNECTIONS

Transmitter Connections

Refer to Electrical Connections Drawing 4501-764 and connect the transmitter to a power supply (24VDC, 100MA minimum) and load (250Ω minimum). Note that the HART Interface Adapter requires a minimum 250Ω loop load to modulate its communication signal.

Model 275 Connections

Refer to Drawing 4501-773 for details on connecting the Model 275 to the process loop. Note that the Model 275 can interface with the transmitter from any wiring termination point in the loop. Typically, the HART Communicator is connected in parallel with the 155H Transmitter, or load resistor. The Acromag Series 155H Transmitter provides test points at the output terminals that may be used as connection points for the test clips of the Model 275. Connection of the Model 275 is non-polarized. Note that your process loop must use a minimum load of 250Ω to achieve communication.

After you make all necessary transmitter, power, load resistor, and Model 275 connections, apply power to the module before turning on the HART Communicator. This will cause the Model 275 to enter the Online Mode upon power-up.

MODEL 275 DISPLAY

The Model 275 HART Communicator uses an 8-line by 21-character liquid crystal display (LCD) window. The connected HART device's model name and its tag name/number is displayed on the top line of the display. The bottom line of the display is reserved for dynamic labeling of the four function keys, F1 through F4, located just below the display window. Refer to Drawing 4501-774 to view this display.

MODEL 275 KEYPAD & CONTROLS

The Model 275 HART Communicator contains 25 different keys, including 4 software defined function keys, 6 action keys, a complete alphanumeric keypad (12 keys), and 3 shift keys. The keys are a "membrane-type" with tactile feedback. Refer to Drawing 4501-774 to view these keys.

Function Keys

Four software-defined function keys labeled F1 through F4 are located just below the Model 275 LCD display window. The functions of these keys will vary as you move through the various menus and dynamic labels will appear at the bottom of the LCD display, just above the function key to denote that key's function at a given point. For example "SAVE" will appear above the [F2] key when that key can be pressed to save device information, or "HELP" will be displayed above [F1] when access to online help is available.

Action Keys

The following action keys are used to navigate through the Model 275 menu structure:

[1/0] ON/OFF Key - Use this key to turn power on and off.

[↑] UP Arrow Key - Use this key to move the cursor up through a menu or list of options, or to scroll through lists of available characters when editing alphanumeric field data.

[↓] DOWN Arrow Key - Use this key to move the cursor down through a menu or list of options, or to scroll through lists of available characters when editing alphanumeric field data.

[←] LEFT Arrow & Previous Menu Key - Use this dual function key to move the cursor to the left or to move back to the previous menu.

[→] RIGHT Arrow & Select Key - Use this dual function key to move the cursor to the right or to select a menu option.

[>>>] HOT Key - Use this key to quickly access important, user-defined options. When the Model 275 is powered off and you press the HOT Key, it automatically powers up and displays your pre-defined HOT Key Menu. When powered and online, pressing the HOT Key will instantly display the HOT Key menu.

When performing certain functions, the message "OFF KEY DISABLED" indicates that you cannot turn the HART Communicator OFF at that point. This feature helps you avoid situations when the power might unintentionally be turned off while the output of the device is fixed or when you are editing a critical device variable.

3.0 CONFIGURATION

MODEL 275 OPERATING MODES

Upon power-up, after the Model 275 completes its self diagnostic routines, it will invoke one of two operating modes: Online (connected to a device), or Offline (not connected to a device). The initial menu screen of the Model 275 will be different, depending on whether the Model 275 is working online or offline.

Powering the Communicator when not connected to a HART device will display the Offline Menu shown below:

```
HART Communicator
1  →  Offline
2     Online
3     Frequency Device
4     Utility
```

A brief introduction to some of the Offline features is found in the Section titled OFFLINE OPERATING MODE. Refer to your Model 275 Manual for more information on The Offline Mode , as this manual is primarily focused on the Online operating Mode described in the next section.

Powering the Communicator when connected to a compatible and currently powered HART device will display the Online Menu, similar to the following:

```
AI-1500:
Online                    ⇐
1  →  Display Data
2     Review Setup
3     Transmitter Setup
4     Xmtr Identifiers
5     Diagnostics
      SAVE
```

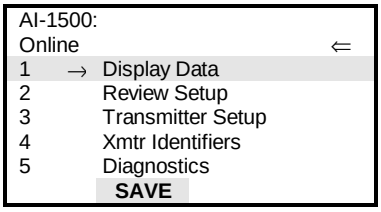
All setup and configuration parameters of the Acromag 155H-0600 Temperature Transmitter can be accessed via the Online Menu.

If the Online menu does not appear, then the device description file of the Acromag Series 155H has not been loaded into the Model 275, or the Model 275 and 155H Transmitter are not properly connected or powered. Note that the Acromag 155H-0600 Transmitter uses the AI-1500 device description file. If your unit does not contain the AI-1500 device description file, you should contact Fisher-Rosemount to obtain an upgrade.

The focus of this manual is on online communication and configuration of the Acromag Series 155H Transmitter with the Model 275 Hart Communicator. Detailed information on HART networks, database management, working offline, etc. can be found in the Model 275 manual that came with your unit and this information will not be repeated here. The next section reviews the online mode and explains the various parameters that pertain to configuration of Acromag Series 155H Transmitters.

ONLINE OPERATING MODE

The Online operating menu is displayed as follows:

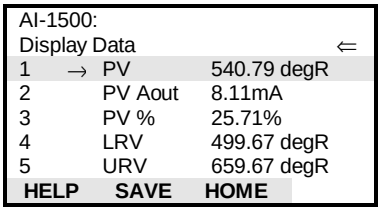


Some of the subsequent menus described in the following sections will provide instant access to the Online Menu shown above by pressing the [F3-HOME] key.

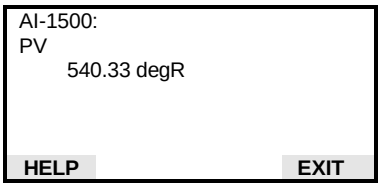
Move through the menu selections with the up and down arrow keys. The Model 275 points to a selection with highlighting. Use the right arrow key to select a highlighted option and move to the next screen or menu associated with that option.

Display Data

Selecting Display Data from the Online Menu above will return a display of the current transmitter measurements (read only) similar to that shown below:



You may select any of the variables noted to get a continuously updated display of that variable. For example, if PV (Primary Variable) is selected, the display will be similar to the following:

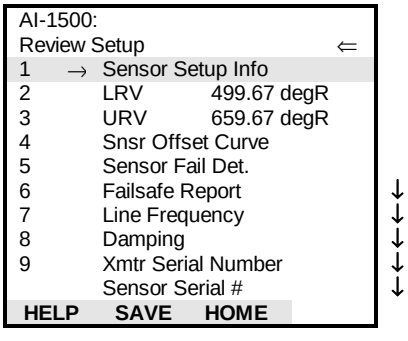


Press [F4-EXIT] to return to the Display Data screen, then press the left arrow key [←] or [F3-HOME] to return to the Online Menu. The Display Data variables are described below:

- **PV/DIFF -** The Dynamic Primary Variable (PV) is the process temperature value (digital value) in selected engineering units. This field is automatically updated as the process temperature changes. If the sensor connection is a Dual 2-Wire RTD Differential or Dual T/C Differential, the label will read “DIFF”, and the differential reading of channel 1 will be displayed.
- **PV AOut/DIFF AOut -** The Dynamic Analog Output current in milliamps. This variable is automatically updated. If the sensor connection is a Dual 2-Wire RTD Differential or Dual T/C Differential, the label will read “Diff AOut” and the analog output of the differential measurement is displayed.
- **PV %/Diff % -** This is the Primary Variable expressed as a percentage of the configured range, based on the LRV and URV. If the sensor connection is a Dual 2-Wire RTD Differential or Dual T/C Differential, the label will read “Diff %” and the differential input measurement in percent of range is displayed.
- **LRV -** The Lower Range Value (4mA point) referred to the input in engineering units.
- **URV -** The Upper Range Value (20mA point) referred to the input in engineering units.
- **Channel 1 -** If the sensor connection is a Dual 2-Wire RTD Differential or T/C Differential, the channel 1 value of the dual measurement is displayed.
- **Cold junction Temp / Channel 2** - If the sensor connection is a Dual 2-Wire RTD Differential or T/C Differential, the channel 2 value of the measurement is displayed. If the sensor type is Thermocouple and the Cold junction Compensation is external via Ni100, the label is Cold Junction Temp.

Review Setup

Selecting Review Setup from the Online Menu will display a screen similar to the following (the additional selections shown beyond the first 5 are accessed via the down arrow key):



The current configuration settings for the transmitter may be reviewed via this screen (read only) by selecting a configuration parameter or data group as required. Use [F4-EXIT] to return to the Review Setup Menu after viewing a parameter. The following configuration data may be reviewed:

- **Sensor Setup Info** - Displays sensor type, sensor connection, sensor serial number, cold junction compensation (if applicable), and linearization status.
- **LRV -** Displays the Lower Range Value (4mA point) and its engineering units.
- **URV -** Displays the Upper Range Value (20mA point) and its engineering units.
- **Snsr Offset Curve -** Indicates if the sensor offset curve has been enabled or not.
- **Sensor Fail Det -** Indicates if failsafe detection is enabled.
- **Failsafe Report -** Indicates if failsafe reporting is enabled and also the failsafe mA value configured.
- **Line Frequency & Filter -** Indicates the line frequency and filtering level selected.
- **Damping -** Displays the damping value selected.
- **Xmtr Serial Number -** Displays the transmitter's serial number.
- **Sensor Serial Number -** Displays the sensor serial number.

Transmitter Setup

Selecting Transmitter Setup from the Online Menu will display a menu of transmitter setup options as follows:

```
AI-1500:
Transmitter Setup                    ⇐
1    →  Input Setup
2       Output Setup
3       Failsafe Setup
4       Output Trim
5       Other Setup
        SAVE    HOME
```

Each transmitter setup selection will access another menu of configuration parameter selections pertaining to that group. Each of the parameter groups are reviewed in the following paragraphs.

Input Setup

Selecting Input Setup from the Setup Options Menu will display the following input setup options:

```
AI-1500:
Input Setup                          ⇐
1    →  Select Sensor
2       Engineering Units
3       Snsr Offset Curve

HELP    SAVE    HOME
```

Select Sensor

Selecting Select Sensor will return a scroll menu of available sensor types similar to the screen shown below. The selection pointer begins at the current configuration and alternate selections are accessed by scrolling upward or downward with the arrow keys. The sensor selection list does not wrap and all available selections may be viewed by pressing the up or down arrow keys as required.

```
AI-1500:
Sensor Type
T/C typ DIN L
↑    T/C typ DIN L
     T/C typ N
     T/C typ R
     T/C typ S
     T/C typ DIN U
     ohm
     mV
     RTD Special
     T/C Special
     Pt100 DIN IEC
     Pt100 SAMA
     Ni100 DIN
     SAMA Ni
     Cr228/229 10 Ohm
     MINCO NI120
     T/C typ B
     T/C typ C
     T/C typ E
     T/C typ J
     T/C typ K
          ABORT    ENTER
```

Pt100 DIN uses the standard "385" curve (DIN Spec 43760, IPTS 68) with 100.00Ω at 0°C and alpha 1.00385. Alpha (α) is used to identify a particular RTD curve. The value of alpha is derived by dividing the resistance of the sensor at 100°C by the resistance at 0°C ($\alpha = R_{100°C}/R_{0°C}$). For Pt 100Ω, this is 138.5Ω/100.0Ω, or 1.385 (also shown as 0.00385Ω/Ω/°C).

Pt100 SAMA uses the standard "392" curve (SAMA RC21-4 or SAMA PR-279) with 98.13Ω at 0°C and alpha 1.003923.

Cr228/229 10 Ohm refers to the standard 10Ω Copper RTD and this curve cannot be selected via the optional LCD display (ATW-TLD).

RTD Special and T/C Special are placeholders for custom curve fitting and have no functionality here.

After selecting a Sensor, you will be prompted to turn Linearization Mode On or Off. Set Linearization Mode ON for Linearization with the Primary Variable unit, or select OFF. This determines whether the transmitter output is to be linear with temperature or not. For mV and ohm Sensor Types, this parameter is automatically OFF. For all other input types, this parameter is generally set to ON for Linearization.

After selecting a sensor and enabling or disabling Linearization Mode, you will be prompted to specify the sensor connection. Available selections will vary according to the sensor type selected. Several possible wiring configurations are available as follows:

THERMOCOUPLE	**RTD**
Millivolt	2-Wire RTD
Thermocouple	3-Wire RTD
T/C Differential	4-Wire RTD
	Dual 2W RTD Diff
	Dual 2W independ
	Dual 2W secure
	Dual 2W average
	Ohm

T/C Differential uses two thermocouples in series to produce an output (output current and measured value) that represents the difference in temperature T/C A - T/C B (see Figure B of Drawing 4501-724).

There are four dual channel 2-wire RTD modes: dual 2-wire independent, secure, average, and differential. The dual 2-wire modes use two RTD's in series to produce a primary variable (RTD A) and secondary variable (RTD B). Both measurements are readable in digital form. Refer to Figure B of Drawing 4501-724 for wiring information.

In dual 2-wire independent mode, the analog output is driven by the primary variable (RTD A). However, if either sensor fails (open or short), the analog output goes to its failsafe level. A shorted sensor will send its corresponding digital reading to a very low clipped value. An open sensor will send the corresponding digital output to a very high clipped value and the opposite digital output to a very low clipped value.

In dual 2-wire secure mode, the analog output is driven by the primary variable only (RTD A). If either or both sensors fail, the analog output goes to its failsafe level. However, if a sensor failure occurs at RTD A, the transmitter will try to report a "good" sensor value for the primary digital variable by returning the secondary variable measurement (RTD B). That is, if RTD A is shorted, the primary digital output variable will assume the value of RTD B. If RTD B is shorted, the digital value of the failed sensor (secondary variable) will indicate a very small clipped value, while the good sensor will continue to report its measured value. If RTD A is opened, both digital values go to a very small clipped value. If RTD B is opened, both digital values go to a very large clipped value.

In dual 2-wire average mode, the analog output is driven by the average value of RTD A & RTD B. If either or both sensors fail (open or short), the analog output goes to its failsafe level. If either sensor is out of range, the analog output goes to its failsafe level. If either sensor is shorted, the corresponding digital variable goes to a very low clipped value. An open sensor will send the corresponding digital output to a very high clipped value and the opposite digital output to a very low clipped value.

In 2-wire differential mode, the analog output is driven by the difference of RTD A minus RTD B. Thus, A must be greater than B for a valid analog output. If A is less than B, the analog output will go to its under-range limit. If either or both sensors fail (open or short), the analog output goes to its failsafe level. If either sensor is shorted, the corresponding digital variable goes to a very low clipped value. An open sensor will send the corresponding digital output to a very high clipped value and the opposite digital output to a very low clipped value.

NOTE: There is no lead-wire compensation associated with 2-Wire RTD connections. Therefore, keep 2-Wire lead lengths to a minimum.

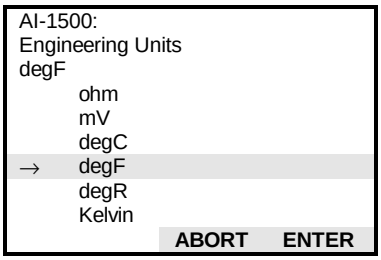
If you have selected a thermocouple sensor, then after selecting a connection type, you will be prompted for Cold Junction Compensation. The current configuration of CJC is displayed first, followed by optional selections. Cold Junction Temperature Compensation is provided for devices with a thermocouple sensor type and can be configured to operate one of the following four ways (except the T/C Differential connection type):

- **Actual CJ Temp** - Use the actual measured temperature of the thermocouple terminals. This is the most common method and will yield the greatest accuracy.
- **Without CJ** - This selection disables cold-junction compensation.
- **Fixed CJ Temp** - This selection allows the transmitter to use a fixed (user-defined) value for cold junction compensation. The fixed user-defined value must be in degrees Celsius.
- **External Via Ni100** - The cold junction temperature is measured via an external two-wire Ni100 RTD connected to terminals 3 & 4 with this selection (see Figure B of drawing 4501-764).

If the sensor type is T/C Differential, the lowest of the two thermocouple junction temperatures is used and you will be prompted for a value for the "Lowest Junction Temp". This refers to a fixed value to be used in the calculations.

Engineering Units

The selection of Engineering Units from the Input Setup Menu will allow you to change the displayed units of measure. Engineering Units will display a screen similar to the following:



These are the available units of measure for the Primary Variable, as applicable to your Sensor Type. Select ohms, millivolts, °C, °F, °R, or K (Kelvin) units. Not all units are available for all Sensor Types.

The selection pointer begins at the current configuration and alternate selections are accessed by scrolling upward or downward with the arrow keys. Use the arrow keys to highlight the desired units, then press [F4-ENTER] to select the highlighted units and the module will convert the LRV and URV to the new engineering units.

Sensor Offset Curve

This transmitter may optionally correct or characterize the Primary Variable along a 2 through 22 point curve that you can configure via segmented linearization. Segmented linearization can be used to perform sensor matching to obtain the highest possible measurement accuracy. Use the Snsr Offset Curve menu selection to specify the number of X,Y point pairs that define the curve (Number of Pairs of Values), followed by the points themselves. Choose from 2 through 22 points. If zero is entered, then optional linearization via this method is turned off.
For each data point, the system will prompt you for the Indicated Value (X, the value read by the transmitter), and the Actual Value (Y, the value you wish the transmitter to read).

Selecting Snsr Offset Curve will display the following:

```
AI-1500:
Enter the number of
pairs of values,
(Min-2, Max-22)
  0
  0
      DEL   ABORT   ENTER
```

At this point, you are being prompted for the number of X,Y point pairs that define your desired curve (Number of Pairs of Values). Choose from 2 through 22 points, or zero. If zero is entered, then optional linearization via this method is turned off. Simply type in the number, then press [F4-ENTER] to proceed.

If you entered a number from 2-22, a screen similar to the following will be displayed:

```
AI-1500:
Point 0 Indicated
Value
Unit: degF
  0.00
  0.00
      DEL   ABORT   ENTER
```

You are being prompted for the first value normally indicated by the transmitter (x, the value read by the transmitter). Enter an input measurement as appropriate. Be sure to observe the current engineering units and range limits. Press [F4-ENTER] to accept the value, and a screen similar to the following will be displayed:

```
AI-1500:
Actual Value
Unit: degF
  0.00
  0.00
      DEL   ABORT   ENTER
```

The screen is asking for the linearized value (y, the value you wish the transmitter to display). Enter an appropriate value. Be sure to observe the current units and the range limits. Press [F4-ENTER] to accept. The above cycle will repeat itself, until all (x,y) pairs have been specified. Measured values between points will be linearly interpolated.

Output Setup

Selecting Output Setup from the Setup Options Menu will display the following output setup options:

```
AI-1500:
Output Setup                    ⇐
1   →  Set LRV
2      Set URV
3      Apply LRV
4      Apply URV
5      Set Damping
HELP   SAVE   HOME
```

This software offers two methods of setting the LRV and URV values. The first method uses “Set LRV” and “Set URV” to set the Lower and Upper Range input Values based on the transmitter’s internal calibration and without the need of an external source. This is the typical factory calibration method. The second method uses “Apply LRV” and “Apply URV” to re-range the transmitter by setting the Lower and Upper Range Values using an external sensor or source. Thus, the second method takes into account any sensor or offset errors. Note that changing the LRV and URV does not affect the module’s internal calibration, only the scaling applied from the input range to the
4-20mA analog output.

Set LRV (Lower Range Value)

CAUTION: This step will affect the 4-20mA output reading. Be sure to remove the loop from automatic control.

Use Set LRV to set the Lower Range Value, or 4mA point of the transmitter. Use the same engineering units. The LRV is the input reading that is to correspond to 4.000mA at the output. It is the lowest value of the measured input signal that the transmitter is configured to measure. Set LRV will display the current LRV as shown below, and a new value may be entered using the number keys.

```
AI-1500:
Enter LRV
    40.00   degF
    40.00
HELP   DEL   ABORT   ENTER
```

Press the [F4-ENTER] key to enter the new value or the [F3-ABORT] key to keep the current setting as is.

The effect of setting LRV in this manner versus “Apply LRV” (explained below) is that you are setting the output zero based on an input level that is determined with respect to the transmitter’s internal calibration (e.g. irrespective of any sensor errors or offset).

Set URV (Upper Range Value)

CAUTION: This step will affect the 4-20mA output reading. Be sure to remove the loop from automatic control.

Use Set URV to set the Upper Range Value, or 20mA point of the transmitter. Use the same engineering units. The URV is the input reading that is to correspond to 20.000mA at the output. It is generally the highest value of the measured input signal that the transmitter is configured to measure. Set URV will display the current URV as shown below, and a new value may be entered using the number keys.

```
AI-1500:
Enter URV
    200.00   degF
    200.00
HELP   DEL   ABORT   ENTER
```

Press the [F4-ENTER] key to enter the new value or the [F3-ABORT] key to keep the current setting as is.

The effect of setting URV in this manner versus "Apply URV" (explained below) is that you are setting the output full-scale based on an input level that is determined with respect to the transmitter's internal calibration (e.g. irrespective of any sensor errors or offset).

Apply LRV (Lower Range Value)

Use Apply LRV to re-range the transmitter by applying the process signal that corresponds to the LRV (4mA) output value. The transmitter will read the applied process temperature and enter that value as the new LRV. The following message will be displayed:

WARN-Loop should be removed from automatic control.

The purpose of the warning is to remind you that the output loop current will change as a result of this action and any subsequent control devices in the signal chain may be affected. After removing the process loop from automatic control, press [F4-OK] to continue. Make sure that the sensor or signal source is properly connected to the transmitter input terminals and adjusted to the correct LRV level. The transmitter will read the input signal and display the process temperature and current LRV on the Model 275's screen. Press OK to continue. The new LRV is displayed and the system will display:

Accept new value
Read new value
Abort

Read New Value will update the Primary Variable by reading the current input from the transmitter. Choose *Accept* to have the new LRV sent to the transmitter. Choose *Abort* to end the process without changing the LRV.

The effect of setting the LRV in this manner versus "Set LRV" (explained above) is that you are setting the output zero based on an input level that is received from your sensor or external source. This allows you to set the LRV while including any sensor error or offset that may be present.

Note that Apply LRV will add offset to both the set LRV and URV values, while Apply URV only affects the URV value indicated. Note that [Apply LRV] and [Apply URV] do not affect the module's internal calibration, only the scaling applied from input to analog output.

Apply URV (Upper Range Value)

Use Apply URV to re-range the transmitter by applying the process temperature measurement that corresponds to the URV (20mA) output value. The transmitter will read the applied process temperature and enter that value as the new URV. The following message will be displayed:

WARN-Loop should be removed from automatic control.

The purpose of the warning is to remind you that the output loop current will change as a result of this action and any subsequent control devices in the signal chain may be affected. After removing the process loop from automatic control, press [F4-OK] to continue. Make sure that the sensor or signal source is properly connected to the transmitter input terminals and adjusted to the correct URV level. The transmitter will read the input signal and display the process temperature and current URV on the Model 275's screen. Press OK to continue. The new URV is displayed and the system will display:

Accept new value
Read new value
Abort

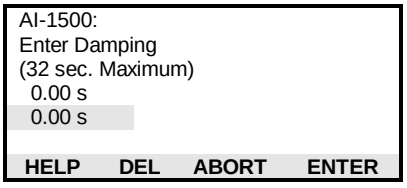
Choose *Accept* to have the new URV sent to the transmitter. Choose *Read* to read and display a new URV. Choose *Abort* to end the process without changing the URV.

The effect of setting the URV in this manner versus "Set URV" (explained above) is that you are setting the output full-scale based on an input level that is received from your sensor or external source. This allows you to set the URV while including any sensor error or offset that may be present.

Note that Apply LRV will add offset to both the set LRV and URV values, while Apply URV only affects the URV value indicated. Note that [Apply LRV] and [Apply URV] do not affect the module's internal calibration, only the scaling applied from input to analog output.

Set Damping

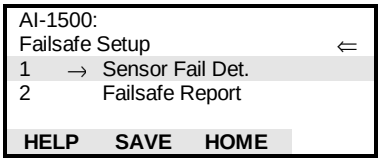
Set Damping is used to set the exponential damping (filtering) to be applied to the input signal (0s is default setting). Selecting Set Damping from the Output Setup Options Menu will display the following:



The current damping time will be displayed and a new value may be entered using the number keys. Damping will increase the response time of the transmitter to help smooth the output when the input signal contains rapid variations. Press the [F4-ENTER] key to enter the new value, or [F3-ABORT] to keep the current setting as is. Damping can be set anywhere between 0 and 32 seconds.

Failsafe Setup

Selecting Failsafe Setup from the Setup Options Menu will display the following failsafe setup options:



The Failsafe Setup Menu allows you to configure the action taken by a module in response to the detection of a sensor failure or line breakage. The unit may be configured to detect a sensor, display a fail-safe message (optional display required), and optionally send the output signal to a fixed current (the high or low range limit, or other user-specified level).

Sensor Fail Detection

This option is used to enable or disable the detection of a sensor failure or line break. The Sensor Failure Detection screen is displayed as follows:

```
AI-1500:
Sensor Failure
  Detection
On
  On
  Off
                ABORT   ENTER
```

Move the highlight to On or Off as desired, then press [F4-ENTER] to set your selection.

Note: If the module is configured for a thermocouple sensor type, it will periodically inject a few microamperes of current into the sensor to test for an open condition. Be warned that some T/C calibrators may have a problem with this and introduce error into the calibration as a result. By turning off sensor failure detection, the current pulses are disabled and miscalibration via these calibrators can be avoided.

Failsafe Report

You may optionally configure this transmitter to send the output to a fixed mA level upon failsafe detection to alert the operator that there may be a problem with the sensor, transmitter, or wiring. If you select Failsafe Report, the following screen will be displayed:

```
AI-1500:
Failsafe Report
LOW - 3.6mA
  OFF
  LOW - 3.6mA
  HIGH - 23.0mA
  OTHER
                ABORT   ENTER
```

Select OFF to disable failsafe detection, LOW-3.6mA to send the output to 3.6mA upon detection, or HIGH-23mA to cause the output to be set to 23mA upon detection. If you select OTHER, you will also be prompted to enter a value between 3.6MA and 23mA to send the output to upon failsafe detection.

If a transmitter has failsafe turned off and a lead breaks, it will report a large voltage at its terminals (open) and the output will be pegged at its maximum value (21mA). If failsafe is turned on and a lead breaks, the output is sent to its failsafe limit (3.6mA, 23mA, or other user-defined level).

Output Trim

Selecting Output Trim from the Transmitter Setup Menu will display the following menu:

```
AI-1500:
Output Trim                    ⇐
1   →  Loop Test
2      Trim 4-20mA
3      Reset Analog Trim
HELP   SAVE   HOME
```

Output Trim allows you to precisely test the 4mA, 20mA, or other output level, or trim the 4mA and 20mA output limits. Output Trim can also be used to reset the analog output end points to their original factory trim settings.

Loop Test

Selecting Loop Test will display the following message:

```
AI-1500:
WARN-Loop should be
removed from
automatic control

                ABORT   OK
```

Press [F4-OK] and the following screen will be displayed:

```
AI-1500:
Choose analog output
level
1       4mA
2       20mA
3       Other
4       End
                ABORT   ENTER
```

Loop Test allows the transmitter's analog output to be adjusted to a selected constant value to verify the accuracy of its current, or to use the transmitter as a constant current source. Press [F4-ENTER] to drive the output to the level selected (highlighted) and verify your measurement against the transmitter for 4mA, 20mA, or any output level between 3.6mA and 23mA (Other).

Trim 4-20mA

The Trim 4-20mA selection of the Output Trim Menu allows the user to calibrate the transmitter analog output 4mA and 20mA endpoints. Selecting Trim 4-20mA will display the following message:

```
AI-1500:
WARN-Loop should be
removed from
automatic control

                ABORT   OK
```

WARNING: The 4.00mA & 20.00mA limits are already factory calibrated to a precision standard traceable to NIST. Trimming the output limits will void traceability of calibration to NIST. Do not arbitrarily trim the output unless a precise method of measuring the output current is available. Further, the 4.0mA & 20.0mA limits should not be trimmed more than ±0.05mA, or transmitter operation may be impaired.

Press [F4-OK] and the following screen will be displayed:

```
AI-1500:
Connect reference
meter

                ABORT   OK
```

If you are going to be trimming the zero and full-scale output limits, you will need to connect a precise current milliampmeter in series with the load, or a voltmeter across a precision output load resistance, in order to precisely read the output signal of the transmitter before continuing.

Press [F4-OK] and the following screen will be displayed:

```
AI-1500:
Setting fld dev
output to 4mA

                ABORT   OK
```

Press [F4-OK] and the output will be set to 4mA and the following screen will be displayed:

```
AI-1500:
Enter meter value

      4.00

HELP  DEL  ABORT  ENTER
```

Compare the meter's reading with the transmitter's indicated output for the 4.00mA endpoint. If the readings differ, then you will type in the meter's measurement in the highlighted field, then press [F4-ENTER] and this value will become the transmitter's new 4mA reference point.

WARNING: The 4.0mA & 20.0mA limits should not be trimmed more than ±0.05mA, or transmitter operation may be impaired.

After entering a value as appropriate and pressing [F4-ENTER] to proceed, the following screen is displayed:

```
AI-1500:
Fld dev output   4.00
mA equal to reference
meter?
1       Yes
2       No

              ABORT  ENTER
```

If you select No (highlight No) and press [F4-ENTER], the prior screen will be displayed again where you will type in your measurement and press [F4-ENTER]. The screen above is then displayed again prompting you if the measurements agree. This iterative cycle will continue until you highlight "Yes" and press [F4-ENTER] (Yes, the meter agrees with the transmitter value). The Model 275 then moves onto trimming the 20.00mA endpoint in similar fashion as described below.

After trimming the 4mA end point, the following screen will be displayed:

```
AI-1500:
Setting fld dev
output to 20mA

                ABORT   OK
```

Press [F4-OK] and the output will be set to 20mA and the following screen will be displayed:

```
AI-1500:
Enter meter value

      20.00

HELP  DEL  ABORT  ENTER
```

Compare the meter's reading with the transmitter's indicated output for the 20.00mA endpoint. If the readings differ, then you will type in the meter's measurement in the highlighted field, then press [F4-ENTER] and this value will become the transmitter's new 20mA reference point.

WARNING: The 4.0mA & 20.0mA limits should not be trimmed more than ±0.05mA, or transmitter operation may be impaired.

After entering a value as appropriate and pressing [F4-ENTER] to proceed, the following screen is displayed:

```
AI-1500:
Fld dev output   20.00
mA equal to reference
meter?
1       Yes
2       No

              ABORT  ENTER
```

If you select No (highlight No) and press [F4-ENTER], the prior screen will be displayed again where you will type in your measurement and press [F4-ENTER]. The screen above is then displayed again prompting you if the measurements agree. This iterative cycle will continue until you highlight "Yes" and press [F4-ENTER] (Yes, the meter agrees with the transmitter value).

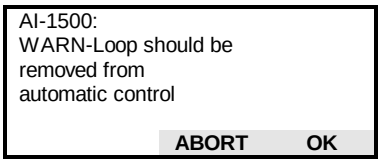
The following message is then displayed briefly, "Returning field device to its original output". Then the following screen will be displayed:

Press [F4-OK] and you will be returned to the Output Trim menu.

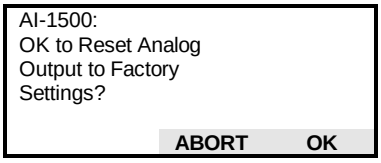
Reset Analog Trim

This option allows you to reset the analog output to the original factory trim settings and restore NIST traceability of the output signal in case of miscalibration.

Selecting Reset Analog Trim will display the following message:



Press [F4-OK] and the following screen will be displayed:

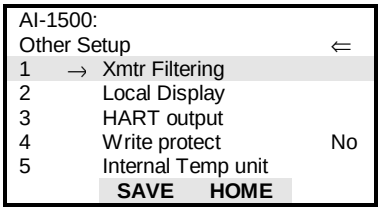


Press [F4-OK] and the original factory output trim settings will be restored. Next, the following screen will be displayed:

Press [F4-OK] and you will be returned to the Output Trim menu.

Other Setup

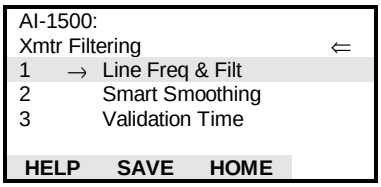
Selecting Other Setup from the Transmitter Setup Menu will display the following menu:



Each of these options are explained in detail in the following paragraphs.

Xmtr Filtering

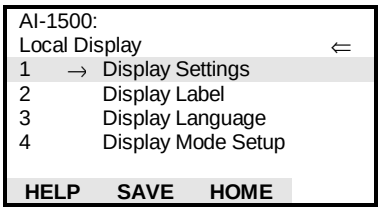
Xmtr Filtering allows filtering parameters to be set for three methods of filtering. This is useful to help increase noise immunity and smooth the input and output response. Selecting Xmtr Filtering from the Other Setup Menu will display the following menu of filtering parameters:



- **Line Frequency & Filter:** This selection will return the current line frequency and filter setting and allow optional frequency and filter settings to be entered. Power line induced interference may be reduced by setting this value to the local line frequency. Select 50 or 60 Hertz, High Filter or High Speed. Select High Speed to maintain optimum transmitter response time, while providing reasonable filtering. For extremely noisy environments, select High Filter (note that this selection will double the update time of the transmitter).
- **Smart Smoothing:** This selection will return the current time interval used by the smart smoothing filter and allow you to type in a different value if you wish. Smart Smoothing refers to a method of averaging successive A/D readings to achieve greater accuracy. It works by establishing a narrow tolerance band which defines an acceptable deviation from one A/D reading to the next. The width of this band is ±5 microvolts referred to the A/D input. With smart smoothing turned ON (any value greater than 0), as long as a reading is within the tolerance band, it is averaged with the previous readings and passed through to the transmitter output. If the reading is outside the tolerance band, it is immediately passed to the output (not averaged first) and smart smoothing is reset around this new reading. This ensures that any significant change in the process is reflected in the output without additional delay. The number of readings to average is controlled by adjusting the length of the smoothing time. Specify a value between 0.25 and 30 seconds (10s is default factory setting). Reducing this time will improve the transmitter response time in reaction to small changes within the tolerance band, but with potentially greater process noise effect.
- **Validation Time:** This selection returns the current validation time and allows you to change this value as desired. Validation time is the interval used for bad data suppression. Specify a time between 0.25 seconds and 10 seconds (0.5 seconds is the default factory value). This is the length of time (dead time) the transmitter will wait before responding to a variation in the input signal. As such, the signal must be received longer than this time before the transmitter will recognize and act upon it. It is great for helping to filter out process spikes or electrical noise on the input signal.

Local Display

Selecting Local Display from the Other Setup Menu will display the following menu of optional display parameters:

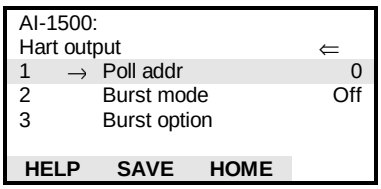


These parameters control the operation of the optional Model ATW-TLD LCD display. Each of these options are explained in detail in the following paragraphs.

- **Display Settings:** This selection will return the current display variable and allow optional variables to be selected. The Display Setting is the variable to be displayed by the optional LCD display (Model ATW-TLD). Select from the following variables:
  - Display PV - Displays the process temperature or primary variable.
  - Display % of Range - Displays the equivalent percent value for the selected range.
  - Display AOut in mA - Displays the analog output value for the selected range in milliamps.
  - Alternate PV / AOut - Alternately displays the primary variable and the analog output value.
  - Alternate PV / % of Range - Alternately displays the primary variable and the percent value.
- **Display Label:** Use up to 7 alphanumeric characters to define a display label that will be printed on the bottom line of the display (not the Model 275 display) if the Display Setting parameter is configured for PV (Process Variable) or Alternate PV. If display is set to % or mA, an appropriate label will be automatically displayed.
- **Display Language:** Returns the current language setting and allows optional languages to be specified. This is the language to be used in displayed prompts and messages for the optional ATW-TLD display only. Select from English, German, French, or Spanish.
- **Display Mode Setup:** This is the local keys enable or disable for the optional ATW-TLD display. Set to Enable to permit push-button reconfiguration via the optional display. Use disable to help prevent inadvertent field reconfiguration or tampering by locking out the reconfiguration capability of the optional ATW-TLD display push buttons.

HART Output

Selecting HART Output from the Other Setup Menu will display the following menu of HART parameters:



These are the parameters used by the HART communication protocol for this device:

- **Poll Addr:** This selection returns the current polling address (normally set to 0) and allows you to set another address as appropriate to your network. This is the address used by a host system to identify a transmitter when it is used in a digital communication network. The transmitter address can be a number from 1 to 15 and all transmitters on a network must be setup for digital output only. The transmitter output would be fixed at 4mA. In a digital network, a HART Primary Master is present (used for data acquisition, maintenance, or control), along with a Secondary Master (could be a HART Comunicator used for configuration, diagnostics, and reporting purposes). Manufacturers of these devices should be contacted fo more information on Digital Networking with HART instruments.
- **Burst Mode:** Use this selection to enable or disable Burst Mode functionality for this device. Refer to your Model 275 User's Manual for more information on Burst Mode operation.
- **Burst Option:** Use this selection to specify the variables that will be bursted if burst mode is enabled. You may select PV (the primary variable), % Range/Current (the percent of range of the primary variable and the analog output 1 current), or Process Vars/Crnt (all dynamic process variables and the analog output 1 current).

Write Protect

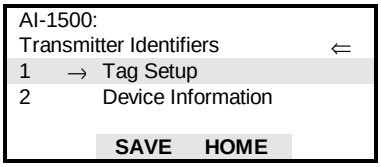
This option has no application for the Acromag Series 155H and is set to No (disabled).

Internal Temp Unit

Selecting Internal Temp Unit of the Other Setup Menu will return the units of measure for the internal cold junction compensation circuit and allow you to specify °F or °C for this displayed measurement.

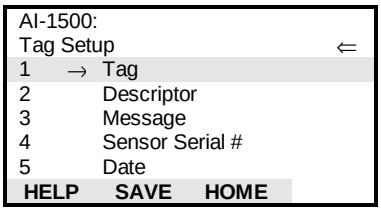
Transmitter Identifiers

The Transmitter Identifier Menu provides options for setting or reviewing device identification parameters. Selecting Transmitter Identifiers from the Online Menu will display a menu of transmitter setup options as follows:



Tag Setup

Selection of Tag Setup from the Transmitter Identifiers menu will display the following:



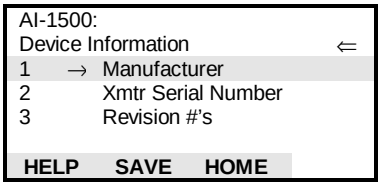
Selection of these parameters will allow optional user-defined identification information to be entered and stored in non-volatile memory within the module. Each of these items are described below:

- **Tag:** Selection of Tag will allow you to specify up to 8 alphanumeric characters that represent the tag name of the transmitter. This tag name will be displayed on the top line of the Model 275 display, next to the model.
- **Descriptor:** Specify up to 16 alphanumeric characters that describe this installation.
- **Message:** Specify an optional message of up to 32 alphanumeric characters.
- **Sensor Serial Number:** Specify up to 7 alphanumeric characters that represent the sensor serial number used with this installation.
- **Date:** Specify the date of installation, configuration, or last date of service in the International MM/DD/YYYY format.

Device Information (Fixed)

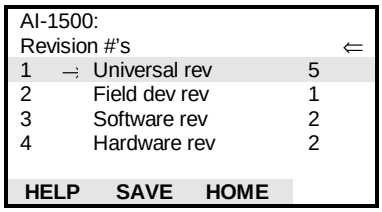
This information is fixed and cannot be modified by the user. It is provided for reference purposes and displays the revision levels of various aspects of the connected transmitter. The module manufacturer, transmitter serial number, universal HART command revision level, field device revision (device description), software revision, and hardware revision are indicated.

Selection of Device Information from the Transmitter Identifiers Menu will display the following:



These selections will return the following information:

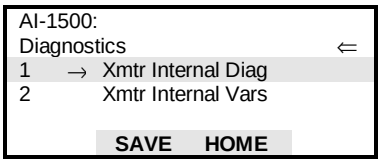
- **Manufacturer:** Returns the name of the manufacturer of the transmitter that the current device description file applies to. Note that the Acromag Model 155H-0600 will use the Accutech AI1500 device description file.
- **Xmtr Serial Number:** Returns the connected transmitter's factory coded serial number.
- **Revision #'s:** Returns a selection menu of various software and hardware revision levels for the connected device as shown below:



Diagnostics

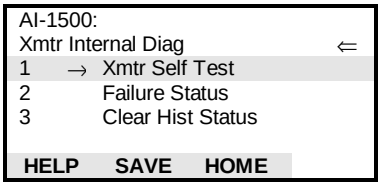
Diagnostics allows access to diagnostic data and routines useful for trouble-shooting an installation and for diagnosis of problems with the transmitter, sensor, internal memory, wiring, ambient temperature, and configuration. It also allows you to view the internal temperature of the device and the cold junction temperature of the device (these temperatures are normally equal).

Selecting Diagnostics from the Online menu will return the following menu:



Transmitter Internal Diagnostics

Selecting Xmtr Internal Diag from the Diagnostics Menu will return the following menu:



- **Xmtr Self Test**: Selecting this option will cause the transmitter to perform a self-test routine and gather the current error status.

- **Failure Status:** This option allows the current and historical diagnostic status of communications with the connected module to be viewed. This screen will report eight status errors as follows (subsequent status messages are accessed by pressing [F3-NEXT]):

  Transmitter Failed - The transmitter is not working or has lost power. Repair or replacement required.
  Redundant Sensor Failed - Check the sensor.
  EEPROM Disturbed - The internal Electrically Erasable and Programmable Read Only Memory is corrupted or has failed. Call the factory.
  PROM Checksum Failed - The internal programmable read-only memory has been corrupted. Call the factory.
  PV Out Of Sensor Limits Or Bad- the process variable is outside of its configured range or is bad. Check the measurement chain.

Sensor Open Or Short - An open or broken input lead or shorted sensor is present. Check the sensor.
Device Temp < -40°C or > 85°C - The internal temperature sensor has detected a device temperature outside of the acceptable range for this module. Check ambient.
Configuration Measuring Range Invalid - The measurement range configured for the current input type is invalid. Check your range configuration.
Historical Status - Reports errors that have occurred since last clearing the historical status flags.

Each status indicator is displayed individually. The current status will be displayed first, followed by the historical status if these indicators had been set in the past. Use the PREV (F2) and NEXT (F3) keys to cycle through these indicators. Use EXIT (F4) to quit viewing the status indicators.

- **Clear Hist Status:** Use Clear Historical Status to reset the historical status indicators to OFF. Note that if the error is still present, the historical status will not be cleared.

OFFLINE OPERATING MODE

The Model 275 can also be used to manage setup and configuration information while working "Offline" (not connected to a module). Powering the Communicator with no device connection will display the message "No Device Found". Next press OK and the Offline Main Menu shown below appears:

```
HART Communicator
1  →  Offline
2     Online
3     Frequency Device
4     Utility
```

A brief introduction to some of the Offline Menu options follows. Refer to your Model 275 manual for complete information.

Offline

Selection 1 (Offline) from the Offline Main Menu will return the following display:

```
HART Communicator
Offline                    ⇐
1  →  New Configuration
2     Saved Configuration

 HELP
```

This menu allows you to compile a set of device configuration data for downloading to a HART device later. You may also edit a saved configuration.

New Configuration

Selecting New Configuration will present a Manufacturer scroll list with device descriptions currently installed in your HART communicator. The Acromag Series 155H is designed to be fully compatible with the Accutech Model AI-1500 and will use that device description file from Accutech. Thus, for use with the Series 155H, select Accutech.

Simply use the up or down arrow keys and move the highlight to ACCUTECH, then press the right arrow key to access the Model Menu for Accutech. Highlight the Model AI-1500, then press the right arrow key to access the Field Device Revisions for that model. A list of currently installed software revisions for the selected field device (Dev) and device description (DD) will be displayed. Select a device revision appropriate to your unit. If needed, you can access the device information for a connected unit via the Online Menu>device Setup>Detailed Setup>Device Information path.

After selecting your device description and software revision level, you will be sent to the New Configuration Blank Template Menu shown below:

```
Unnamed
From Blank Template        ⇐
1→    Mark All
2     Unmark All
3     Edit Individually
4     Save As…
 HELP    SAVE
```

- **Mark All:** Select *Mark All* to flag all the configurable variables to be sent to a HART compatible device. The configurable variables are all those that appear when you edit variables in the configuration using the Edit Individually option of the Blank Template Menu described below.

- **Unmark All:** Select *Unmark All* to remove the flags from all the configurable variables in the configuration. Unmarked configuration variables are not sent to a HART compatible device.

- **Edit Individually:** Select Edit Individually to open the Edit Individually Menu that contains all of the configurable variables listed below:

Sensor Type	Validation Time
Sensor Connection	Failsafe Report
Display Units	Failsafe mA Value
Temp Conn	Internal Temp Unit
Damping	Tag
Linearization	Descriptor
Sensor Fail Det	Message
Cold Junction Temp	Date
Engineering Units	Display Label
Damping	Display Language
LRV	Display Mode Setup
URV	
Line Frequency	
Smart Smoothing	

Successive variables are accessed by pressing [F1-NEXT]. Variables are selectively marked by pressing [F2-MARK]. Press [F3-EDIT] to edit a parameter. Press [F4-EXIT] to exit return to the From Blank Template Menu.

For example, if you wish to change the engineering units from °F to °C for this device description, find the Engineering Units configuration variable (use [F1-NEXT] to move through the listing), press the F3-EDIT Key, move the highlight to the desired units, and press the [F4-ENTER] key to select it.

The Esc key will return you to the Edit Individual Variable screen. Then press the [F4-EXIT] key to return to the From Blank Template Menu, or [F1-NEXT] to move onto editing another variable. Note that the [F2-MARK] key of the Edit Individually variable menu is used to mark a variable to be sent to a connected HART device.

- **Save As:** Select Save As to save your new configuration to either the memory module, or optional Data Pack. This menu may also be used to enter or edit the configuration name and data type. The standard memory module will hold up to 10 configurations while the Data Pack holds up to 100 additional configurations. The Save As Menu is shown below:

```
Unnamed
Save As…                          ⇐
1→   Location                Module
2    Name
3    Data Type Standard

 HELP      SAVE
```

First specify the location for saving the current configuration by selecting Location. The Location Menu is shown below:

```
Unnamed
Location
Module
       Module
       data pack

 HELP            ESC    ENTER
```

Select Module or Data Pack for your configuration destination as desired, then press [F4-ENTER] to return to the Save As Menu.

Next, select Name to name your configuration file. The current name will be indicated first, followed by an edit field for typing in a new name. Type in a new name as desired, then press [F4-ENTER] to set the name of the file to be saved.

Next select the data type: standard, partial, or full. Data type refers to the set of editable variables when defining a new device configuration. Data type standard is the set of editable variables used when defining a new device configuration. Data type partial refers to a set of all marked variables only. Data type full refers to a set of all device variables.

When location, name, and data type have been configured, press [F2-SAVE] off the Save As Menu to save your new configuration as specified, and return to the Offline Menu screen.

Saved Configuration

Saved Configuration is used to access configuration data already saved in your HART Communicator. Selecting Saved Configuration from the Offline Menu will return the saved Configuration Location Menu. Select from Module Contents, Data Pack Contents, or Personal Computer to identify the storage location of the file to retrieve.

The Personal Computer selection has no application with respect to Acromag 155H-0600 transmitters. Selecting either Module or Data Pack will list all saved configurations by their assigned Tag information that reside at the selected location.

The module or data pack configuration listings provides two additional functions for navigating large lists of saved configurations:

- **FLTR**: The [F1-FLTR] filter key will allow you to get a list of configuration files that match your filter requirements for the files tag, descriptor, or name information. Your filter may utilize two special characters: period (.) and asterisk (*). Period replaces a single character of any value. The asterisk replaces zero or more characters of any value. For example: to return all configurations that start with “A-“ and end with “1”, you may use the filter A-*-.1.
- **XPAND:** The [F2-XPAND] expand function key will allow you to view the tag, descriptor, and name information of the current selected (highlighted) configuration file.

After making a Saved Configuration selection, press the right arrow key to enter the Saved Configuration Menu below:

```
Your Configuration File Name Here
Saved Configuration               ⇐
1    →   Edit
2        Copy to…
3        Send
4        Print
5        Delete
6        Rename
7        Compare
 HELP
```

Selecting “Edit” will display the Edit Menu. This menu has the same functions as the described under the Edit Individually function and this information will not be repeated here.

Selecting “Copy to…” will allow you to specify the storage location where you want the copy to be stored. You may also change the configuration file name with this option.

Select “Send” after completing your configuration to send your saved configuration to a connected device.

The selection “Print” is not implemented and has no current function.

Select “Delete” to remove a saved configuration from a memory storage location. A confirmation message will appear and you will then press “Yes” or “No” to complete the deletion.

Select “Rename” to access the Configuration Name Edit Menu and make any name changes, then enter and save the data to return to the previous storage location menu.

The “Compare” function is used to compare a selected device configuration from a storage location with another device configuration. The Model 275 will compares device types, variables, marked lists, etc. between files and a message will appear indicating whether the configurations agree or not.

Note that to make a valid comparison, the data storage format must be the same between the files. The device type (including manufacturer), device type number, device revision, and DD revision must also match. Further configurations can only be compared against other configurations containing the same set of variables.

Refer to your Model 275 Communicator manual for additional information regarding these features.

Online

Selecting Online from the Offline Menu is provided as a convenient method of entering the Online Mode from the Offline menu, without having to power the Model 275 down and then up after connecting to a compatible transmitter. Online will attempt to establish communication with a connected device, then display the Online Menu already described in the prior section "ONLINE OPERATING MODE".

Frequency Device

Selecting Frequency Device from the Offline Menu has no application with respect to Acromag 155H-0600 transmitters and is used for the display of frequency and pressure measurement information of current-to-pressure devices. Refer to your Model 275 user's Manual for information on this selection.

Utility

Selecting Utility of the Offline Menu will access the Utility Menu shown below:

HART Communicator		
Utility		⇐
1	→	Configure Communicator
2		System Information
3		Listen for PC
4		Storage Location
5		Simulation

This menu allows you to to customize features of your Model 275 as follows:

- **Configure Communicator:** Access parameters that control polling, contrast, off-time, and ignore diagnostics.
- **System Information:** Access features and information pertaining to the Model 275 motherboard, program module, and data pack.
- **Listen For PC:** Used for setting up the Model 275 for data transfers and requests from a Personal Computer running Asset Management Solution software. Refer to your Model 275 User Manual for more information.
- **Storage Location:** Used to customize the memory storage locations of your Model 275. Refer to your Model 275 User Manual for more information.
- **Simulation:** You can use this selection to determine the device types loaded into your memory module. You can also use Simulation to configure a device offline (not connected) and then download this device configuration later using the SAVE function.

Refer to your Model 275 Manual for additional details on these and other features of your Communicator.

4.0 TROUBLESHOOTING

SOFTWARE SELF DIAGNOSTICS

The Model 275 has a Diagnostics screen that will report errors received from the transmitter. This screen is useful for trouble-shooting an installation and for diagnosis of problems with the transmitter, sensor, internal memory, wiring, ambient temperature, and configuration. Refer to Diagnostics of Section 3.0 for instructions on using this tool.

TROUBLESHOOTING HINTS

If You Cannot Communicate With Module…

- Are the test clips of the Interface Adapter connected directly across the current sense resistor (155H)?
- Have you applied power to the module before booting the Configuration Program?
- Is the loop power supply at a voltage sufficient to supply 12V to the terminals of the transmitter, plus the current sense resistor drop (12V + 0.023 * R-LOAD)?
- Is power supplied to the loop in the correct polarity (plus side of power supply connects to plus side of transmitter output).
- Is the power supply capable of supplying 100mA at the required voltage?
- Is the current sense resistor greater than or equal to 250Ω (minimum required by Interface Adapter to modulate its signal)?

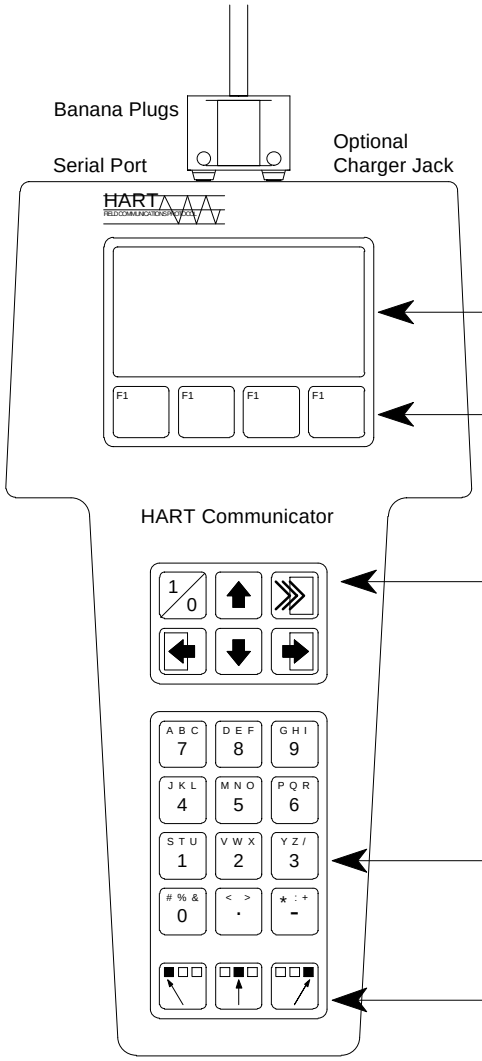
If you have the optional display, you can use it to help verify proper wiring and operation of the transmitter by plugging it directly into the top of the transmitter and checking if it registers data.

If The Optional Display Fails To Indicate…

- This usually indicates that there is a problem with the power supply. Verify power connections to the transmitter. Is power wired in the correct polarity? Is power level within the recommended 12-42V range? Is your power supply current being current-limited below 100mA?

If you continue to have problems with the Model 275, inquiries should be directed to Fisher-Rosemount. If you have problems with your 155H-0600 Transmitter, Acromag's Application Engineers can provide further technical assistance at (248) 624-1541.

MODEL 275 HART COMMUNICATOR



Communicator Model Number & Serial Number On Back Of Unit

MODEL 275

LCD DISPLAY:
8 Lines Of 21 Characters

FUNCTION KEYS F1-F4:
Software Defined - See Display Window For Current Function.

ACTION KEYS:
On/Off (1/0)
Scroll Up (Up Arrow)
Quick Access Key (>>>)
Previous Menu (Back/Left Arrow)
Scroll Down (Down Arrow)
Select (Forward/Right Arrow)

ALPHANUMERIC KEYS:
Use Shift Keys Below To Select Upper Characters

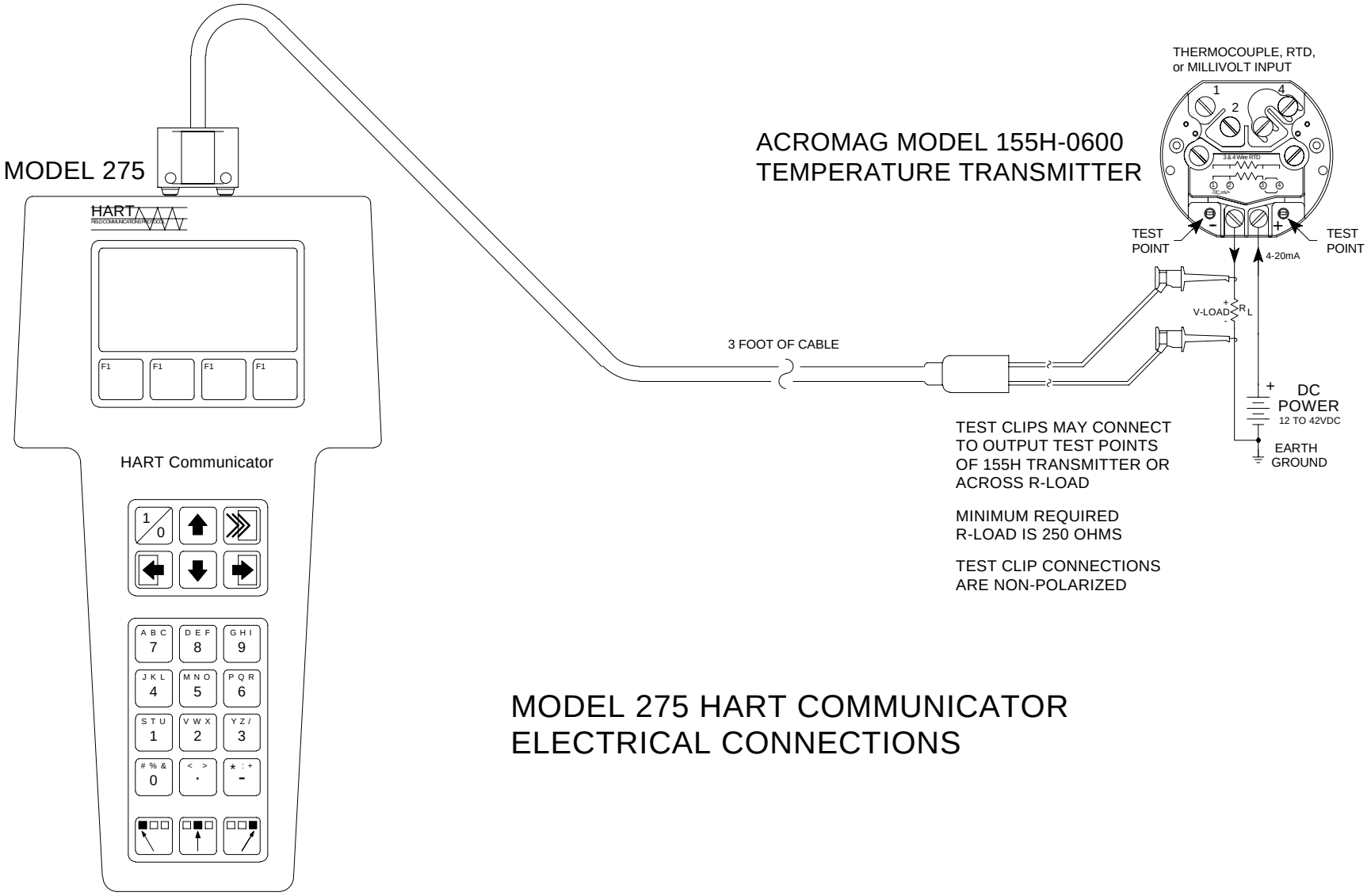
SHIFT KEYS:
Used to select alphabetic and other characters located above numeric, period, and dash keys. Arrow points to character position.

NOTE: A minimum loop resistance of 250 ohms is required for the Model 275 to achieve communications.

The Model 275 loop connections are not polarized.

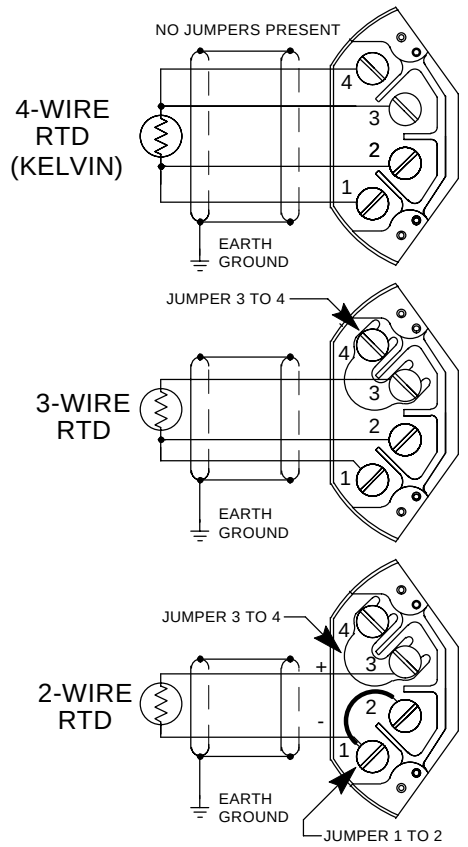
Connect the Model 275 test clips in parallel with the load or the transmitter.

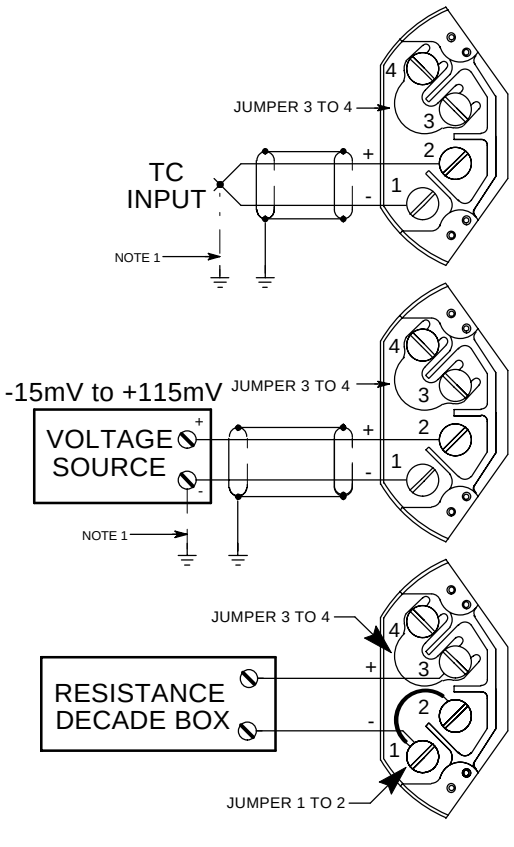
4501-774A



MODEL 275 HART COMMUNICATOR ELECTRICAL CONNECTIONS

4501-773A

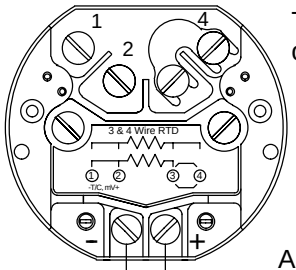




TERMINAL CONNECTIONS PER INPUT TYPE

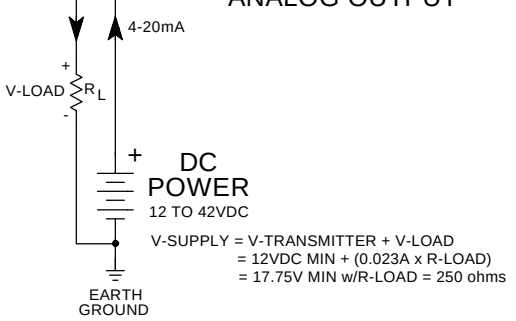
TERM	mV/TC	2-WIRE RTD	3-WIRE RTD	4-WIRE RTD
1	(-)	(-), JUMP 1 & 2	(-), RTD COM	(-), COM LEAD B
2	(+)	JUMP 1 & 2	(-), RTD COM	(-), COM LEAD B
3	JUMP	(+), JUMP 3 & 4	(+), JUMP 3 & 4	(+), COM LEAD A
4	JUMP	JUMP 3 & 4	JUMP 3 & 4	(+), COM LEAD A

SEE INPUT CONNECTIONS AT LEFT



THERMOCOUPLE, RTD, or MILLIVOLT INPUT

ANALOG OUTPUT



NOTE 1: THIS GROUND CONNECTION IS RECOMMENDED FOR BEST RESULTS. IF SENSORS ARE INHERENTLY CONNECTED TO GROUND, USE CAUTION AND AVOID MAKING ADDITIONAL GROUND CONNECTIONS WHICH COULD GENERATE GROUND LOOPS AND MEASUREMENT ERROR.

WARNING:
FOR COMPLIANCE TO APPLICABLE SAFETY AND PERFORMANCE STANDARDS, THE USE OF SHIELDED CABLE IS RECOMMENDED AS SHOWN. ADDITIONALLY, THE APPLICATION OF EARTH GROUND MUST BE IN PLACE AS SHOWN IN THIS DRAWING. FAILURE TO ADHERE TO SOUND WIRING AND GROUNDING PRACTICES MAY COMPROMISE SAFETY AND PERFORMANCE.

SAFETY GUIDELINES MAY REQUIRE THAT THIS DEVICE BE HOUSED IN AN APPROVED METAL ENCLOSURE OR SUB-SYSTEM, PARTICULARLY FOR APPLICATIONS WITH VOLTAGES GREATER THAN OR EQUAL TO 75VDC/50VAC.

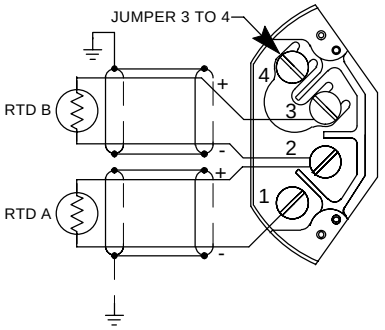
ELECTRICAL CONNECTIONS

MODEL 151T-0600 or 155H-0600 TRANSMITTER

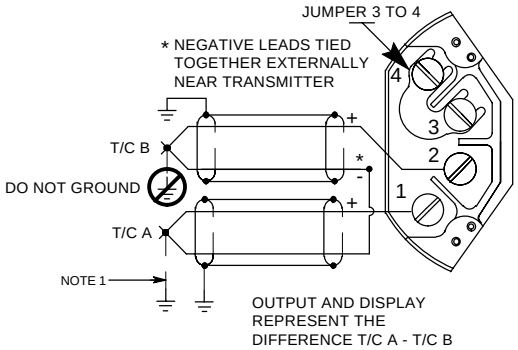
FIGURE A
4501-764A

ALTERNATE CONNECTION METHODS

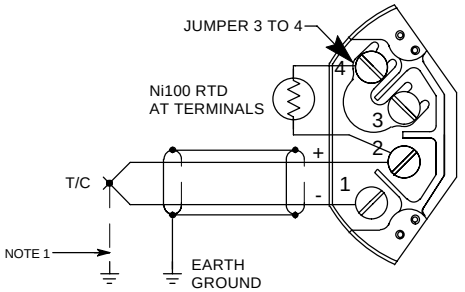
DUAL 2-WIRE RTD



T/C DIFFERENTIAL CONNECTION



T/C CONNECTION WITH EXTERNAL CJ SENSING



CONNECTION TYPES:
Dual 2-Wire Independent
Dual 2-Wire Secure
Dual 2-Wire Average
Dual 2-Wire RTD Differential

ELECTRICAL CONNECTIONS

MODEL 151T-0600 or 155H-0600 TRANSMITTER

NOTE 1: THIS GROUND CONNECTION IS RECOMMENDED FOR BEST RESULTS. IF SENSORS ARE INHERENTLY CONNECTED TO GROUND, USE CAUTION AND AVOID MAKING ADDITIONAL GROUND CONNECTIONS WHICH COULD GENERATE GROUND LOOPS AND MEASUREMENT ERROR.

FIGURE B
4501-764A